REMARKS

Claims 17-31 currently appear in this application. The Office Action of May 6, 2002, has been carefully studied. These claims define novel and unobvious subject matter under Sections 102 and 103 of 35 U.S.C., and therefore should be allowed. Applicants respectfully request favorable reconsideration, entry of the present amendment, and formal allowance of the claims.

Claim Objections

Claim 6 is objected to because "i" should be replaced with "in."

The present amendment cancels claim 6, so this objection is now moot.

Rejections under 35 U.S.C. 112

Claims 8 and 16 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

This rejection is respectfully traversed. Claims 8 and 16 have been cancelled, and new claims have been submitted. It is believed that the new claims all conform to the requirements of 35 U.S.C. 112.

With respect to the term "3-10% aqueous solution", the electrochemical activation technology used in the present invention involves only water,

electricity, and a small quantity of salt (as a catalyst to improve conductivity) to generate the mixed oxidant and mixed reductant species. More specifically, a dilute salt solution is exposed to an electric field to produce the disequilibrious state responsible for the elevated activity of the two emerging product streams, which are respectively referred to as anion-containing solution and cation-containing solution, according to the electrode at which they are produced.

The 3-10% aqueous solution refers to the basic starting dilute salt solution prior to exposure to the electric field.

The physical characteristics of each solution can be adjusted, depending upon the particular type of fresh produce being treated. For example, the application for lettuce is different from that of tomatoes or dairy products. Each different type of produce treated is best treated with solutions having particular characteristics, such as pH, oxidation-reduction potentials and agglomeration (anolyte) and de-agglomeration (catholyte) properties. These characteristics can be manipulated to provide optimum sterilization of the food storage facility. As noted above, the ceramic diaphragm divides the reactor into two compartments, the anode compartment and the cathode compartment. Water enters the reactor and exist from

these compartments as two separate streams, the predominantly anion-containing stream (anolyte) and the predominantly cation-containing stream (catholyte). The characteristics of the anolyte and the catholyte depend, *inter alia*, on the duration of their exposure to the electric field, the voltage of the electric field, and the like. In addition, some or all of the catholyte can be returned to the anode compartment so as to vary the properties of the anolyte being produced. Similarly, some or all of the anolyte can be returned to the cathode compartment so as to vary the properties of the catholyte being produced.

Art Rejections

Claims 1-4, 6-7, 10 and 12-16 are rejected under 35 U.S.C. 102(b) as being anticipated by Doi, EP 0802164.

This rejection is respectfully traversed. The present invention is directed to independent production, harvesting, and use of a predominantly cation-containing stream and a separate predominantly anion-containing stream. While it is known to produce electrochemically activated aqueous solutions *per se*, it has not heretofore been known to produce and harvest two separate product stream, wherein one product stream is a cation-rich stream and the other product stream is an anion-rich stream, and to apply the two product streams separately,

either concurrently or successively. The present applicant has found that there is a vast difference in the characteristics and efficacy of an electrochemically activated saline solution if the predominantly cation-containing solution and predominantly anion-containing solutions are produced, harvested, and applied as two separate product streams, either concurrently or successively, as compared to their effect when they are produced, harvested, and applied as a single stream or solution comprising both cation and anion containing solution.

This separability is made possible by the electro-chemical reactor comprising an electrochemical cell with two cylindrical electrodes in a co-axial arrangement and with a cylindrical co-axial diaphragm between the electrodes. More particularly, the electrolytic cell of the present invention comprises a central rod anode around which the concentric ceramic tube diaphragm is arranged. The outer tubular wall of the reactor acts as the cathode. The co-axial diaphragm separates an annular inter-electrode space between the two co-axial electrodes into a cathodic chamber and an anodic chamber, respectively. It is because of this particular electrochemical cell arrangement that the cation-rich and anion-rich streams are separable and can be applied as two separate product streams, either

simultaneously or consecutively in bactericidal treatment of bulk food storage containers and fresh produce. In addition, the electrochemical cell of the present invention provides for a much higher and more uniform electric field to which the solutions are exposed. This provides for a higher level of "activation" of the solutions that which is normally obtained with other types of electrolytic cells.

The two solutions produced in the present invention are unique in that they not only each have their own unique characteristics and applications, but also often have strong synergistic roles to play in some specific applications.

Doi does not propose separating or independently using the cation and anion containing streams or solutions. In fact, Doi proposed "introducing raw water... into an electrolytic cell without a diaphragm between the cathode and the anode" (page 3, line 38; page 4, lines 16 and 39). Moreover, Doi discloses preparing raw water containing hydrochloric acid by adding hydrochloric acid to the raw water (page 4, line 32). Hydrochloric acid is a highly corrosive substance. Not only is it harmful to the equipment, but it is also harmful to the operators of the equipment in that it can cause skin burn and eye irritations. Hydrochloric acid is also cytotoxic, which requires that the food storage

containers be rinsed after treatment to render them safe for containing food. A further disadvantage of Doi is that the low acidity of Doi's product (pH 0.5-3), as disclosed on page 4, line 26, would result in taste modifications of foodstuffs stored in containers cleaned with the Doi solution and could not be used at all for dairy products. The present invention specifically excludes the use or need for harsh substances such as hydrochloric acid.

Unlike the products from chlorine generators, applicant's invention provides for two solutions which, although they are extremely effective in killing and controlling harmful microorganisms, remain harmless to humans and animals. In addition, the solutions of the present invention are environmentally friendly, even in their undiluted form. Through appropriate control of feed materials and production conditions, the anolyte and catholyte of the present invention, when compared with equivalent chlorinator products, tend to have a lower concentration of chlorine species and a higher concentration of a host of other oxidizing radicals, which ensure greater efficacy in destroying microorganisms because of a synergist effect. Further, where required, for example, in sensitive foodstuffs applications, it is possible in the present invention to produce products that are free of chlorine.

Claims 5, 8-9 and 11 are rejected under 35 U.S.C. 103(a) as being unpatentable over Doi.

This rejection is respectfully traversed. As noted above, there is nothing in Doi that teaches or suggests using both an anolyte stream and a catholyte stream for treating bulk food storage containers. Doi requires the use of hydrochloric acid, which is not at all the case in the present invention. The present invention uses a salt, not an acid, and the pH of the liquids used is between about 2 and 9, resulting in minimal, if any, effect on the flavor of the food stored in the treated container.

It is noted that the prior art made of record but not relied upon is merely considered to be pertinent to applicant's disclosure.

In view of the above, it is respectfully submitted that the claims are now in condition for allowance, and favorable action thereon is earnestly solicited.

Respectfully submitted,

BROWDY AND NEIMARK, P.L.L.C.
Attorneys for Applicant(s)

By _____
Anne M. Kornbau
Registration No. 25,884

Telephone No.: (202) 628-5197
Facsimile No.: (202) 737-3528
AMK:nmp
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IN THE SPECIFICATION

Please amend the last paragraph on page 1, lines 15-19, through page 2, lines 1-3 as follows:

The use of bulk food storage containers for fresh fish such as those on fishing boats and trawlers, often constituted by the hulls themselves, ~~travelling~~ traveling out to sea for lengthy periods on their fishing trips, is well known. As the fish are caught they are ~~storesstored~~ typically in crushed ice in the storage containers and hulls of trawlers and boats. Once sufficient fish have been caught, the trawlers return to harbour where the fish are off-loaded and processed. In many cases much of the preliminary processing, such as "gutting", is done on board out at sea.